REMARKS

Claims 1-5, 11-13, 15, 16, 19 and 25-30 are pending in this application. By this Amendment, claims 1-4, 13, 15, 16 and 19 are amended. Claims 25-30 have been added. Claims 6-10, 14, 17, 18 and 20-24 have been canceled without prejudice to or disclaimer of the subject matter found therein. No new matter has been added.

I. Claim Rejection Under 35 U.S.C. §102

In paragraph 2, on page 2 of the Office Action, claims 1-24 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,677,552 to Ogura. The rejection is respectfully traversed.

Claims 1 and 16 now recite wherein the successively formed n-type emitter layer, the p-type base layer, the active layer, and the n-type base layer constitute a first semiconductor layer group which functions as a first bipolar transistor, and the first bipolar transistor is controlled to adjust an amount of electrons to be injected into the active layer,

and wherein the successively formed p-type base layer, the active layer, the n-type base layer and the p-type emitter layer constitute a second semiconductor layer group which functions as a second bipolar transistor, and the second bipolar transistor is controlled to adjust an amount of holes to be injected into the active layer,

and wherein by controlling at least one of said amount of electrons and said amount of holes to be injected into said active layer, an intensity of light generated and oscillated is modulated. Ogura fails to disclose or suggest these features.

In contrast to the claimed invention, Ogura discloses a thyristor laser, which is operated such that the PNPN structure functions as a thyristor by using only two or three electrodes coupled to the some parts of the four layers in the PNPN structure (Ogura, col. 3, lines 47-50). Although the thyristor is turned on and off by applying electrical voltage from a separate photo-transistor to parts of the PNPN structure through either two or three

electrodes, this thyristor is not used to excite the thyristor laser. Fig. 3 demonstrates that the driver circuit for the PNPN semiconductor element is formed by connecting a pair of NPN-type phototransistors to an n-gate electrode (Ogura, col. 4, lines 40-43). Fig. 4 shows that the driver circuit for the PNPN semiconductor element is formed by connecting a pair of NPN-type phototransistors to an n-gate electrode and a p-gate electrode (Ogura, col. 5, lines 9-17).

The PNPN structure of the laser according to Ogura functions as both a thyristor and two driving circuits (photo transistor and/or transistor, as shown in Figs. 3 and 4 of Ogura).

In contrast to the thyristor laser of Ogura, the laser of the claimed invention is not a thyristor laser. In general, a thyristor is a device with turn-on characteristics that can be controlled by externally applied voltage or current. Ogura operates as a thyristor when a forward voltage is applied to the p and n electrodes on the opposite ends of the semiconductor element (Ogura, col. 3, lines 14-18). Another distinction between Ogura and the claimed invention is that the claimed invention operates such that the NPNP structure functions as two transistors by using all electrodes coupled to the four layers in the NPNP structure. Ogura, instead, uses only two or three electrodes couple to parts of its four layer PNPN structure.

Furthermore, in the laser of the claimed invention, an NPN structure and a PNP structure are included in a single NPNP structure/element and are operated to inject holes and electrons into an active layer, respectively. Support for this feature of the invention can be found, for example, in paragraph [0011] on page 3 of the specification. As described in paragraph [0011], in the semiconductor laser of the claimed invention, in contrast to Ogura, since the pn junction semiconductor laser and the bipolar transistors made of the first semiconductor layer group and the second semiconductor layer group are incorporated, if the semiconductor laser and the bipolar transistors are controlled independently, the excitation of the active layer and the light generation of a given wavelength through the current injection and the transportations of the electrons and the holes by the first and the second

semiconductor layer groups can be performed independently. Therefore, the laser of the claimed invention is driven with a control technique, which is extremely different from that of Ogura.

Furthermore, the Office Action alleges on page 3, with respect to claims 11 and 12, that Ogura discloses a laser having a semiconductor layer group being made of III-V group semiconductor compound consisting of a certain GaAs system. However, the laser GaAs system disclosed by Ogura does not contribute to a Gun-effect. On the other hand, the features of claims 11-15 of the invention can generate a Gunn-effect. Ogura fails to teach the configuration capable of generating a Gunn-effect.

II. New claims 25-30

Claims 25-30 are patentable over Ogura. Claim 16 is set forth above. Claims 25-30 depends from claim 16. Thus, Ogura does not disclose or suggest claims 25-30 for at least the reasons set forth above with respect to claim 16 and as well for the additional features claims 25-30 recite.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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Attachment:
Petition for Extension of Time

Date: August 9, 2006

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